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Challenges for Service Science

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Abstract
The call for papers for the SIG SVC 2011 workshop notes the importance of service oriented thinking and says that the workshop's goal is to explore the challenges of service orientation in IT. This paper is a conceptual contribution to the discussion. It uses ten suggestions as an organizing scheme for exploring basic questions about the nature and subject matter of service science. The questions are related to topics such as the definition of service and service system, the desirability of privileging service and servitization over products and productization, and the treatment of co-production of value, value constellations, and tradeoffs between conflicting stakeholder interests. The final suggestion is that research publications should declare a stance toward people and organizations related to treating them as though they are fallible humans, dutiful components of service systems, or humans simulating machines.

Keywords: service, service science, service system, servitize, co-creation of value.

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WHAT SHOULD SERVICE SCIENCE TALK ABOUT?

Although it is less than 10 years old, service science has already become the focus of substantial research and attention. The research and attention is deserved because of the continually increasing economic significance of services. In its current state, however, there is a great lack of clarity about what service science is about. Consider, for example, the joint sense of the following three quotations, and their joint implications for service science.

> "In order to differentiate from competitors, those organizations frequently expand their offerings (Becker and Krcmar 2008; Böhmann et al. 2008) ... product-oriented organizations follow the notion of servitization and develop and market product-related services (Vandermerwe and Rada 1988), while service-oriented organizations apply the idea of productization to include products in their services or market services as product (Baines et al. 2007)." (Herzfeldt et al., 2010)

> "The servitization of processes, architectures and technologies (e.g. service-oriented organizations, service-oriented architectures, service-oriented computing and service-oriented infrastructures) have evolved as a new paradigm for enterprise systems development, supporting intra-enterprise and inter-enterprise collaboration through access to autonomous, implementation-independent interfaces to data, software and infrastructure services." (Demirkan and Spohrer, 2010)

> "Services account for 75% of the U.S. gross domestic product (Pal & Zimmerie, 2005) and 80% of private sector employment in the U.S. (Karmarkar, 2004)." (Demirkan and Spohrer, 2010)

According to these quotations, product firms can servitize their offerings, service firms can productize their offerings, and 75% of U.S. GDP is in services. Across both product firms and service firms, it is possible to servitize processes, architectures, and technologies through service orientation. In combination, the above quotations and other parts of the service science literature such as IMF and IBM (2008) seem to say that service science is a general umbrella that covers:

- things ranging from totally automated computer-to-computer interactions (e.g., client/server computing and service-oriented architectures) to personal services produced by providers for customers through direct person-to-person interaction,
- things ranging from locally situated service activities (queuing systems in banks and grocery stores) through gigantic service systems such as entire governments, water and electricity systems, international monetary systems, and systems for policing large populations.
- things ranging from the classification of industrial enterprises (as service, industrial, or agricultural) through the operational details of specific service systems within organizations that produce services and/or industrial or agricultural products.

During its infancy as a new discipline, there is nothing wrong with treating service science as an umbrella term encompassing everything that has *service* in its name. Thus far, it has entailed a diverse set of research reports, theoretical specifications, case descriptions, and practitioner viewpoints, plus some search for commonalities, distinctions, and principles related to systems, methods, and even ecosystems.

An earlier working title of this paper, "Servitizing or Productizing -- Should that Be the Question?" addresses the spirit of many challenges related to central issues that affect the future development of service science. Overall, what should service science talk about? Is the main question in service science really about services and servitizing? What do we really mean by services and servitizing? Should we be interested in servitizing but not in its mirror image, productizing? Should we be concerned that servitizing processes and systems is often linked to commoditization of processes (Davenport 2005; Demirkan and Spohrer 2010), which usually enhances product-like characteristics? Should service science espouse symmetrical vocabulary and treatment of services for human customers and services consumed by computerized entities? Each of this paper's ten challenges for service science is stated as a suggestion for pursuing a potentially valuable direction in theory development and research. Many of these suggestions can be pursued initially by simply looking at existing research to see what it says about the object of the suggestion. Other suggestions call for new research, or at least new syntheses of previous research. Some of the suggestions may be controversial because they touch on topics that some researchers view as relatively settled (such as the definition of service), even at this early stage in the development of service science. Other suggestions might seem to be outside of the realm of service science. Consideration of this combination of suggestions might lead to new ideas for developing service science.

SUGGESTION #1: USE A BROADLY APPLICABLE DEFINITION OF SERVICE

A good definition of service would have the following characteristics:

- It would emphasize the essence and would conform to everyday understandings of what service is.
- It would differentiate between products and services in typical real world situations.
- It would not introduce unnecessary restrictions on what a service is.
- It would cover every type of activity that most people consider services, including services for external customers and for internal customers; automated, IT reliant, and non-automated services; customized, semi-customized, and non-customized services; personal and impersonal services; repetitive and non-repetitive services; long-term and short-term services; services with varying degrees of self-service responsibilities.

Unfortunately service science does not currently have a commonly agreed-upon, readily usable definition of service that applies to almost all situations that business professionals, computer scientists, and other researchers would consider services. Existing definitions either do not apply very well to many common services or treat almost any economic activity as a service. For example, following Alter (2011) consider whether the original Netflix CD rental business is a service (before extensions related to streaming access). Most people would regard Netflix as a service business, yet even a glance at seven definitions in the literature shows shortcomings in relation to the initial Netflix offering.

1) Netflix gives their customers temporary custody of tangible physical objects and therefore does not seem to be "an act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything." (Kotler and Keller 2006).
2) Netflix gives their customers temporary custody of tangible physical objects, and therefore is not just "a provider-client interaction that creates and captures value" (IBM Research 2009).
3) Use of the CD (analogous to consumption) is not simultaneous with production, involves exchange of custody of goods, and might take place over weeks and therefore is not "a simultaneous or near-simultaneous exchange of production and consumption, transformation in the experience and value that customers receive from engagement with providers, and intangibility in that goods are not exchanged." (Rai and Sambamurthy 2006).
4) Being a Netflix customer does not seem like "a time-perishable, intangible experience performed for a customer acting in the role of a co-producer" (Fitzsimmons and Fitzsimmons 2006).
5) While "the customer provides significant inputs into the production process" (Sampson and Froehle 2006) by selecting the CDs they want to rent, the process of selecting among alternative offerings is inherent in just about any voluntary economic activity.
6) While use of Netflix results in "a change in the condition of a person, or a good belonging to some economic entity, brought about as a result of some other economic entity, with the approval of the first person or economic entity" (Hill 1977), describing the availability of the CD in that way does not seem very natural, whether or not it might generate a good UML state machine diagram.
7) While Netflix involves "capabilities or competencies that one person, organization, enterprise, or system provides for another" (Vargo and Lusch 2004), customers really want CDs, not capabilities or competencies. Furthermore, since all economic activities involve capabilities and competences provided for someone else, by this definition, activities that Netflix performs for its customers are services in the same sense that all other economic activities are services.

None of the above definitions satisfies all desired characteristics of a definition of service. Many introduce restrictions that would disqualify CD rental as a service. Shortcomings of these definitions lead to a simple, dictionary-like definition, "Services are acts performed for others, including the provision of resources that others will use." (Alter 2010). A more general version that also covers automated services replaces the word "others" with "other entities," whereby services are acts performed for other entities including the provision of resources that other entities will use. By this definition, almost any economic activity is a service, regardless of whether it is directed at external customers or internal customers. The service provided by Netflix is a service by this definition. The obvious shortcoming of this definition is that it does not attempt to differentiate between products and services. Not trying to differentiate between products and services is consistent with the third foundational principle in service-dominant logic, "goods are distribution mechanisms for service provision." (Vargo and Lusch 2004).

A challenge for service science is to move forward even though the fundamental distinction between products and services has proven elusive. The approach implied by the third foundational principle in Vargo and Lusch (2004) and stated explicitly by the definition in Alter (2010) is basically to say that that all economic activities are services because they are acts performed for others. The alternatives include finding a definition that applies rigorously to all services or continuing to use definitions that apply to some services but not many others.

As service industries dominate economies, focusing more energy on differentiating neatly between products and services seems less and less useful except in relation to researchers who are concerned with calculating percentage breakdowns that characterize entire economies or industrial sectors. For those researchers, traditional distinctions between agriculture, industrial production, and service production are based on somewhat arbitrary classifications in SIC codes. The SIC codes increasingly encounter a problem of inadequate requisite variety (e.g., Ashby, 1962) whereby classifications into several categories simply misses important issues related to productization and servitization, e.g., the way Neely (2009) identifies twelve different forms of servitization for manufacturers.

A final issue related to definitions of service is that referees, editors, and authors should insist that a given paper should 1) define what it means by service and 2) stick to that definition so that their readers will know what the paper is talking about (unless its explicit purpose is to compare different definitions of service or to look at different connotations of the term service in different settings). This issue is especially important in discussions of "IT services," which can mean anything from organized human activities (e.g., working on help desks, incident tracking, and access management) through totally automated systems and subsystems that operate through computer-to-computer messages that express and respond to requests using preformatted, highly formalized protocols.

SUGGESTION #2: USE A BROADLY APPLICABLE DEFINITION OF SERVICE SYSTEM

Consider two alternative definitions of service system:

> "Service systems are complex adaptive systems." A customer service system "is a service system from the viewpoint of a customer or consumer. A customer service system searches provider value propositions looking for win-win value-co-creation opportunities." A provider service system is "a service system from the viewpoint of a provider. A provider service system aims to meet the customer's needs better than competing alternatives consistently and profitably (in business context) or sustainably (in non-business context). Provider service systems seek deep knowledge of customer service systems … to improve existing, and create new, value propositions." (IfM and IBM 2008)

> "A service system is a work system that produces services. A work system is a system in which human participants and/or machines perform work using information, technology, and other resources to produce products and/or services for internal or external customers. (Alter 2006; 2008). All work systems involved in economic exchange are service systems because they perform work to produce something for the benefit of others. A very small percentage of work systems are not service systems because they involve someone performing work only for personal benefit, such as cleaning one's own office or making one's own lunch." (Alter 2011)

A challenge for service science is to find alternative definitions that are more usable than either of the two above and that lead directly to the interesting insights that can be used for

improving specific service systems. The first definition is very broad and encompasses both a customer's view of the service system and a provider's view. The second is much more limited, but is much easier to apply to the Netflix example above since it is relatively easy for a manager or analyst to identify the participants, customers, process, and so. In contrast, it may not be so easy to describe how a customer service system actually "searches provider value propositions" or how the provider service system "seeks deep knowledge of customer service systems" for the millions of people who use Netflix. Better definitions would be broadly applicable and would also reflect and emphasize characteristics of service systems that would help managers and researchers think about such systems in more depth.

SUGGESTION #3: TREAT SERVITIZING AND PRODUCTIZING SYMMETRICALLY

To date, service science has not produced an encompassing definition of service that fits all situations and that distinguishes between products and services in a clear way. From a business viewpoint, the distinction between products and services is much less important than providing a mix of product and service features that internal or external customers want and find beneficial. The designer's decision (as opposed to the classification decision) is about finding the right location along a series of design dimensions (Alter, 2010).

Consider a traditional textbook, an online version, an online version with interactive exercises, an online version with interactive exercises and interaction with an expert, and, finally, a person-to-person tutorial by an instructor. Each successive modification transforms the book into something that is more service-like until the last approach is clearly a service. Steps toward productizing the person-to-person tutorial service lead in the direction of the traditional textbook; steps toward servitizing the traditional textbook lead in the direction of person-to-person tutorials. In another example, provisioning of meals can be productized by moving step by step toward pre-packaged fast food meals; it can be servitized by moving toward a fine dining experience that is much more service-like even though it consists of tangible things delivered to customers. Many similar examples involve various forms of information distribution, medical care, and many kinds of work that are performed for customers.

Regardless of whether the topic is the products and services produced by a work system within an organization or a firm's economic offerings for its external customers, servitizing whatever is produced means moving toward the right in Table 1, with any particular offering falling in different locations along different dimensions. Similarly, productizing whatever is produced means moving toward the left along the same dimensions. Much more interesting than whether a product or service is being produced is the question of whether the overall offering for the internal or external customers of a system or firm has the right balance of product-like and service-like features across all of the dimensions.

A challenge for service science is to move beyond privileging service and servitizing over products and productizing. Instead, servitizing and productizing should be viewed as strategy directions that can be applied along multiple dimensions. In any particular situation, it may be beneficial to change five dimensions of a product/service offering in the direction of servitizing while changing the other dimensions of that same offering in the direction of productizing.

More product-like	<<----------X----------->>	**More service-like**
Customer value from things that the customer receives	----------X----------	Customer value from provider actions
Customer value from things that the customer uses	--------X----------	Value from experience that the provider produces
Production of value by the provider	----------X---	Co-production of value by the provider and customer
Standardized, scripted interactions and products	---X----------	Customized, non-scripted interactions and products
Value from tangible features of whatever the provider produces	----------X---	Value from intangible features of whatever the provider produces
Transferred to customer and used later	---X----------	Consumed by customer during production
Produced by provider with little or no co-production	----------X----------	Customer plays extensive role in co-production
Transfer of ownership	----------X----------	Non-transfer of ownership
Transaction-based interactions	---X----------	Relationship-based interactions
Interactions not concerned with internal state of customer	---X----------	Interactions trying to discern and respond to internal state of customer

Table 1. Approximate placement of original Netflix service across dimensions for designing products/service offerings (for illustration purposes only; not based on a survey)

SUGGESTION #4: RECOGNIZE THAT SERVITIZING OF PROCESSES, SYSTEMS, AND ENTERPRISES ENHANCES PRODUCT-LIKE CHARACTERISTICS

Interactions between providers and customers in servitized processes, systems, and organizations are characterized by standardized formats for messages related to service requests and service responses, including the details of whatever is conveyed from the provider to the customer. Consider the view of services conveyed in an issue of *IBM Systems Journal* devoted to the service-orientation:

> A service "is generally implemented as a course-grained, discoverable software entity that exists as a single instance and interacts with applications and other services through a loosely coupled (often asynchronous), message-based communication model." (Brown et al, 2005)

> "The component that consumes business services offered by another business component is oblivious to how the provider created the business service." (Cherbakov et al, 2005)

In essence, servitizing processes, systems, and organizations makes interactions between providers and customers more product-like in terms of the dimensions in Table 1. In an automated service regime described by the quotations above, service interactions occur through a message-based communication model, and the customer (the component that consumes business services) does not care how and cannot know how the provider created the business service. While it is certainly possible to use the major concepts of service orientation without insisting on the extremes, service orientation as described in these quotations is quite different from the concept of service for people that is appropriate in a hotel or restaurant. In those service settings, providing excellent service requires going beyond viewing services as unambiguous scripted messages passing back and forth between providers and customers. Bringing service orientation to the enterprise level, Demirkan and Spohrer (2010) say that a servitized enterprise takes performance advantage of commoditization of hardware, software, and even business processes. While the business processes would not all operate through unambiguous scripted messages, the commoditization of business processes surely moves them toward the product-like side of Table 1.

A challenge for service science is to deal with what seems like contradictory meanings and connotations of the same concept. In relation to products/service offerings, servitizing implies adding, reinforcing, or accentuating service components of offerings to customers, often through a combination of customizing for unique individual needs, providing beneficial experiences for customers, involving customers extensively in co-production, performing services based on relationships rather than transactional logic, and trying to discern and respond to the customer's internal state. Servitizing has almost the opposite connotations in relation to processes, systems, and enterprise. Ideally, service science should develop terminology that is not confusing when used in different contexts.

SUGGESTION #5: TAKE CO-CREATION OF VALUE SERIOUSLY

The idea of value has received a great deal of attention in marketing, service, and other fields. Vargo et al. (2008) note that Aristotle differentiated between value-in-use and value-in-exchange over 2000 years ago. Ramirez (1999) notes that "the value of offerings is established only partially in terms of the activity which the supplier has poured into these" [offerings]. Value to the customer includes labor saving value, whereby customers do not have to carry out the activities 'crystallized' in the acquisition," and enabling value, which is related to "the enhanced ease, productivity, safety, elegance, and/or effectiveness" in the acquirer's value creating actions.

Some researchers believe that co-production or co-creation of value (not just value itself) is a defining characteristic of services. For example, Ramirez (1999) traces the history of the concept of value co-production for 290 years, also noting that Normann and Ramirez (1993, 1994) "extended the notion of services to cover all activities in which obtaining actual utility value requires customer value creation."

Table 1 devotes one of its design dimensions to co-production of value. Treatment as a design dimension says that different service situations involve different degrees of co-production or co-creation. Instead of focusing on value co-production or co-creation as part of the definition

of service, assume that it usually is co-created and then look at the continuum from minimal co-creation by the customer to extensive co-production by the customer. Typical points along this dimension include:

- The customer does nothing.
- The customer provides a request for service but does little else (minimal level of co-creation)
- The customer participates in aspects of service fulfillment processes (beyond specifying requirements)
- The service occurs through multiple service interactions including direct participation by customers.
- A self-service approach is used, whereby the service provider creates and provides the means by which the customer performs self-service processes and activities.

For understanding, analyzing, and improving specific product/service offerings, the interesting question is the extent to which the customers are or should be co-producers or co-creators of value. The changes might be in the direction of more co-creation or less. For example, customers who just want something to be done might prefer reducing or even minimizing the extent of co-creation, as might apply for a service such as cleaning houses or shoveling snow. In contrast, customers who want to be involved might prefer increasing the extent of co-creation, such as finding ways to engage more directly with service providers whom they find interesting or inspiring.

Taking co-creation seriously might be an interesting direction for research related to topics such as IT-related services, the value of IT, and IS/IT analysis and design. In regard to IT-related services, it would be interesting to look at the extent of co-production or co-creation of value in real-world examples of the various service systems covered by the Information System Infrastructure Library (ITIL), which is summarized in itSMF (2007). ITIL proposes best practices for services such as incident management, request fulfillment, access management, and release and deployment management. It would be interesting to characterize the extent of co-production in ITIL's proposed best practices, and to test empirically whether the proposed extent of co-production is actually beneficial in practice for some or most of the ITIL processes. In regard to the value of IT, it would be interesting to correlate the extent of co-production of value in IT-intensive processes in organizations, and to see whether co-production of value tends to increase customer satisfaction and/or provider efficiency within specific types of service processes that appear in many organizations, such as supply chain, hiring, customer service, and management processes. In regard to systems analysis and design, it would be interesting to see whether the concept of co-production of value is even on the radar screen in most textbooks. It would be more interesting to develop concepts, methods, and tools that could be useful for characterizing the extent of co-production in an existing or proposed system, and for identifying potential changes in a system that might achieve a more appropriate level of co-production, regardless of whether that level involves more or less co-production/ co-creation of value by customers.

SUGGESTION #6: DESCRIBE CO-CREATION OF VALUE IN RELATION TO SERVICE SYSTEMS

One of the most basic concepts of systems is that systems have a boundary. Co-creation of value by customers is relatively obvious in many situations, such as when the attitudes and activities of hotel guests affect the value they receive from a hotel stay. Notice, however, that

value creation may or may not extend after the end of the hotel stay. A customer's value from staying in an acceptable business hotel while on a business trip may be forgotten quickly, whereas customer's value from staying in a unique tourist hotel in exotic location may generate pleasurable remembrances decades later. Similar phenomena apply to music instruction, where the customer's engagement affects value capture during the course of instruction, but where much of the value from the instruction may extend over decades in the future as the former student builds upon the instruction in future enjoyment and/or performance of music. In a more product-like example that can be considered a service if one accepts the third foundational principle of Vargo and Lusch (2004) or the definition of service from Alter (2010), almost all of the value capture from the production and delivery of custom-built home furnishings would occur outside of the service system that specifies the customer's order, produces the furniture, and delivers it. The customer might use the furniture for the next 30 years in ways that the provider might not anticipate, and surely would never be able to observe. While some of the value was co-created through whatever convenience the customer experienced in the ordering and delivery process, the service system could not include the customer's use of the furniture unless one assumed that the boundary of the service system extends into every customer's home for many years in the future.

A challenge for service science is to find a way to talk about co-creation of value in relation to service systems when much of the value for offerings on the product-like side of the product/service spectrum accrues long after completion of the service provider's activities within the service system.

SUGGESTION #7: LOCATE SERVICE SYSTEMS WITHIN VALUE CONSTELLATIONS

Porter (1985) introduced the idea of value chain analysis in relation to how a particular firm operates through primary (value-adding) activities and support activities. Normann and Ramírez (1994) extended Porter's (1985) the idea of value chain analysis with the concept of *value constellation*, where "value is coproduced by actors who interface with each other. They allocate the tasks involved in value creation among themselves and to others, in time and space, explicitly or implicitly." The idea of value constellation is of great potential importance in service science because few if any firms can produce everything that is needed to provide value to their customers. Along these lines, Vargo et al. (2008) note that Spohrer et al. (2007, 2008) see "service science as the study of service systems and of the co-creation of value within complex constellations of integrated resources."

Detailed attempts to locate service systems within value constellations would go beyond merely identifying outsourced or "out-tasked" activities. It would take more of a system view, and would focus on characterizing both the individual service systems within a value constellation and the value constellation itself as a service system. Relevant ideas for motivating that type of analysis might appear in past research on value configurations (Stabell and Fjelstad 1998), networked value constellations (Tapscott et al. 2000) and various business modeling techniques.

SUGGESTION #8: ILLUMINATE TRADE-OFFS RELATED TO CONFLICTING STAKEHOLDER INTERESTS

The service science literature sometimes settles for the vague concept of "the customer." That concept is insufficient for many service systems whose multiple customer groups and other stakeholders have conflicting perceptions and priorities related to the need for and quality of the various products and services that are produced by a service system. Instead of assuming the existence of "the customer," service science should assume that most service systems in organizations have multiple customer groups and stakeholders whose interests may conflict. Consider common conflicts related to inconsistent customer and provider interests and inconsistent interests of customer groups.

Interests of customers often conflict with the interests of providers because customers are most concerned with the cost, quality, reliability, and other characteristics of whatever they receive from a service system, whereas providers are also concerned with the system's efficiency. While an idealized service system should provide the best service in an internally efficient manner, there are many situations in which internal efficiency reduces responsiveness to customers and may increase their costs. For example, an organization's accounts payable system may be designed to maximize the efficiency of the accounts payable clerks within the general constraint of paying the bills on time. From a customer's viewpoint, immediate payment upon receipt of the invoice would be more convenient and more profitable.

There also may be goal conflicts between different groups of customers. For example, an information system that provides up-to-the-minute operational results may satisfy top management's desire to have current information, but may cause many problems for lower-level employees, who would rather be able to analyze their own operational results before having to respond to inquiries from managers who receive the same raw data at the same time. In contrast to this simple information system example, imagine how many different customer groups are involved in complex supply chains and in complex service systems in society, such as water systems, transportation systems, and medical systems.

SUGGESTION #9: RECOGNIZE THE VALUE AND LIMITATIONS OF FORMALIZATION

The simplest aspect of formalization appears in clear definitions of terms and relationships, and in matching terms, relationships, and theories to the specific situations that are being discussed. The most complex aspect of formalization appears in abstraction from real world situations into mathematical notations that are difficult or impossible for all but PhD level researchers to understand. The service science literature has encountered difficulties in both areas.

The more informal and aspirational parts of the service science literature are sometimes vague, with terms such as service, IT service, servitization, customer, value, and value proposition defined unclearly or not at all. Too often, interesting examples of service and service systems do not conform to definitions of service and service system, even in the same paper. While the spirit of that part of the literature sometimes comes through in a clear and actionable manner, there or other times in which the ideas are not clear enough to transfer to other situations.

The more formalized parts of the service science literature use mathematical notations that sometimes seem to obscure as much as they illuminate. For example, assume that the discussion of a service situation starts with the statement that a service offering consists of services $s_{i,}$ delivered by providers p_j, to customer $C_{k,m}$ within customer segments C_m, with

provider-related cost $c_{i,j}$ and provider- related value proposition $vp_{i,j,k}$. Assume that that notation is part of a complex mathematical determination of an equilibrium condition or a market clearing price related to a service offering. While the economics and management science literature abound with valuable theory papers that express concepts using complex notations, Greek letters, and subscripts and superscripts, there is some question about whether notations of that type can capture things such as the quality of service interactions that are mentioned in Carlson's (1989) book about the "moments of truth" when service is delivered. A challenge for service science is to recognize the tension between simply being vague, on the one hand, and using such a high degree of formalization that the spirit of service disappears from the analysis.

SUGGESTION #10: DECLARE WHETHER PEOPLE AND ORGANIZATIONS ARE TREATED AS INCONSISTENT AND FALLIBLE HUMANS DRIVEN BY PERSONAL AND GROUP MOTIVATIONS, AS DUTIFUL COMPONENTS OF SERVICE SYSTEMS DOING THEIR BEST TO MEET EXPECTATIONS, OR AS FLAWLESS COGS IN A PRECISE AND HIGHLY REPEATABLE MECHANICAL SYSTEM

Clarification of important assumptions is one of the most basic tenets of research, critical thinking, and model building. Clarification of assumptions about people and organizations is especially important in service science because its scope is so broad, encompassing situated person-to-person interactions, large impersonal systems at the level of entire enterprises or geographical regions, and also architectures for building software. At the risk of generalizing without citing specific papers, parts of service science that are inspired by computer science and service-oriented architectures sometimes seem to assume that people are non-participants in systems (but perhaps users of technology) or that they are dutiful components of service systems who will perform specified processes and activities consistent with designers' intentions and management's goals. It is almost as though any people who are included within service systems are humans simulating machines. At the other side of service science, there is recognition that people are fallible components of relatively fragile service systems that cannot control participants' activities directly, but can only guide those activities through a combination of training, incentives, punishments, monitoring, and feedback. The literature of organizational behavior and sociotechnical systems is full of issues related to human variability, motivation, information asymmetry, moral hazard, workarounds, bricolage, and emergent change. While it is often both reasonable and useful to view service system participants as dutiful, if occasionally error-prone components of those systems, there are many other situations where is equally useful to view them as fallible humans or essentially as reliable machines performing work in a prescribed manner. A final challenge for service science is simply to make sure that researchers and authors inform readers about whatever view of people is incorporated in specific research efforts.

CONCLUSION

This paper responded to the call for papers for the SIG-SVC 2011 workshop by exploring aspects of service-oriented thinking and related challenges. It tried to capture the spirit of some of the challenges that service science faces in relation to becoming a more coherent, valuable, and teachable discipline. The future path of service science depends in part on how this paper's ten suggestions (and many other issues not mentioned here) are addressed. One possibility is that

service science will remain basically split between service marketing, service operations, and service-oriented computing, with little real commonality of theory, conceptual development, or real world application between the three areas. Another possibility is that theory development and real world applications will lead to a higher degree of overlap. This paper's ten suggestions attempt to lead in that direction.

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